TS2000

TransSpectral Impedance Scanning

RD7409290-0 Revision F

Service Manual

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TS2000 Service Manual

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1. WARNINGS & PRECAUTIONS

WARNING:

Installation and servicing should be undertaken *ONLY* by qualified service personnel. In order to prevent electrical shock; do not remove covers or panels. This equipment should be used ONLY in accordance with instructions for use

CAUTION:

In the event of defective functioning of TS2000, contact the relevant Siemens service department.

1.1 Symbol Descriptions

Symbols	Description
	Type BF equipment
	Dangerous voltage
	Attention: Consult accompanying documents
O	Off: Power disconnection from the mains
ï	On: Power connection to the mains

NOTE:

The CE 0344 mark for this device can be found on the left side of the central processor.
This device complies with MDD Regulation 93/42/EEC.

2. FUNCTIONAL DESCRIPTION

NOTE:

This Document applies to TS2000 systems from serial no. 02001

2.1 Introduction

2.1.1 Principle

Tissue changes associated with cancer cause significant changes in local dielectric properties of tissue. These dramatic shifts in electrical impedance result from cytological and histological changes involving cellular water content, amount of extra-cellular fluid, membrane properties and packing density and orientation of cells that are typical of malignant tissue transformation.

The electrical impedance (both conductance and capacitance) of malignant tissue is typically 20-40 times lower than that of normal tissue when measured at appropriate frequencies.

TransSpectral Impedance Scanning (**TS2000**) detects cancerous changes in the breast by providing a real-time, two-dimensional visual display of local variations in tissue electrical conductance and capacitance. Changes in tissue electrical conductance and capacitance associated with malignancy result in a characteristic signature that can be readily identified in the **TS2000** image.

TS2000's unique potential to distinguish and detect early signs of cancer is based upon detecting these electrical changes non-invasively.

TS2000 (Trans-Spectral Impedance Scanning) is a unique system designed specifically for non-invasive, accurate detection of early stage breast cancer.

2.1.2 Main features:

- Increased accuracy in the detection of early breast cancer
- Real-time impedance imaging with improved frequency range
- Increased measurement resolution
- Identification of tissue variation location (based on sectors)
- Non-invasive technique
- Safe method of detection - presenting no significant risk to patient or operator
- Patient experiences no discomfort or sensation during procedure
- More affordable system and examination costs
- Minimal training required for the operator
- Age not an inhibiting factor in the accuracy of the results (works well in younger women with dense breast tissue)

TS2000 provides a real-time, two-dimensional visual display of local variations in tissue electrical conductance and capacitance. Tissue changes associated with cancer cause a significant change in local dielectric properties. In the human breast, the electric impedance (conductance and capacitance) of cancerous tissue is typically 20-40 times lower than in normal tissue when measured at appropriate frequencies. The dramatic changes in electrical impedance stem from cytological and histological changes that relate to the cellular water content, the amount of intracellular fluid, membrane properties, the packing density and orientation of the cells. These changes in the electrical impedance of the cancerous tissue can be visualized and identified using the T-Scan system.

Similar, though less dramatic changes are also seen in pre-cancerous abnormal conditions such as atypical hyperplasia, giving T-Scan a potential role in identifying high-risk patients before cancer develops.

The system utilizes a non-invasive approach. A probe is gently pressed against the breast to measure low-level electrical currents generated across a spectrum of frequencies by an electrode held in the patient's hand. The T-Scan image that is produced is divided into sectors allowing for immediate location identification and measurement of any tissue variations.

TS2000 is safe! The T-Scan method of detection is non-invasive, uses no radiation and complies with electrical safety standards. The system uses low voltages and currents for measurement, which cause no

discomfort or sensation. Since the system does not use radiation, it allows for more frequent and consistent monitoring of the patient condition. Over a twelve-year period (with the original prototype device) and 16,000 clinical examinations, there were no reports of harm or adverse side affects to the patient or the operator.

TS2000 uses a totally different method of detecting breast disease than mammography, combining the results of T-Scan with those of mammography may increase the overall sensitivity and/or specificity. Similarly, by combining the results of T-Scan with the Clinical Breast Exam, the diagnostic accuracy of the CBE as performed by primary care physicians should be dramatically improved and quantified for more reliable pre-mammographic screening. The overall outcome of using the T-Scan system should reduce the rate of missed tumors and unnecessary biopsies, and their associated financial and emotional costs.

2.1.3 Comparison with Other Methods of Breast Examination

NOTE:

TS2000 should always be used in conjunction with other methods of breast examination (CBE, mammography, ultrasound) and not as a stand-alone device.

Mammography detects breast disorders by using radiation to identify variation in tissue density. In contrast, **TS2000** uses no ionizing radiation and detects changes in electrical impedance. Because **TS2000** uses a totally different method of detecting breast disease than mammography, combining the results of **TS2000** with those of mammography may increase overall sensitivity and/or specificity of diagnosis.

Similarly, pre-mammographic screening by means of clinical breast exam (CBE) can be made more accurate when CBE is used in conjunction with T-Scan.

2.1.4 Included in this Package

- TS2000 Main Module
- Cart
- Monitor
- Mouse
- Keyboard
- 1 Scan probe – 64 sensors
- 1 Scan probe – 256 sensors
- Transmitter Cylinder
- Transmitter Cable
- Set of CDs including:
  - Windows NT4 and Service Pack 4
  - TransScan Software
  - Printer, VGA, and Zip Drive software
  - Application software
- Isolation transformer for Printer
- Zip Drive
- Modem (Up to and including serial number 2086, thereafter, the modem is an option.)
- Printer (Optional)
- TransScan TS2000 Manual
- Quality Assurance Kit (optional) including:
  - Service Phantom
  - Transmitter Cable X2
  - Five fuses rated at 4 A/230V
  - Five fuses rated at .5 A/230V
  - Five fuses rated at 6.3A/115V
  - Five fuses rated at .5 A/115V
  - Zip Diskette

2.2 System Overview

The TS2000 is housed in a sturdy, portable storage cart and comprised of the following elements (refer to Figure 2-1):

- Monitor
- Main System Console: Computer Base; Processing Module (PM),
- Probe Selection Board (PSB)
- Keyboard and mouse
- Transmitter (reference) cylinder
- 2 Scan (receiver) Probes: Large(Standard), Small(Optional)
- Printer (optional), Modem (optional), and Zip Drive

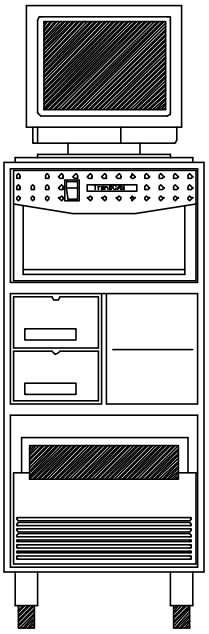

Figure 2-1: Complete TS2000 System in Cart (Front View)

2.3 Block Diagrams (1 and 2)

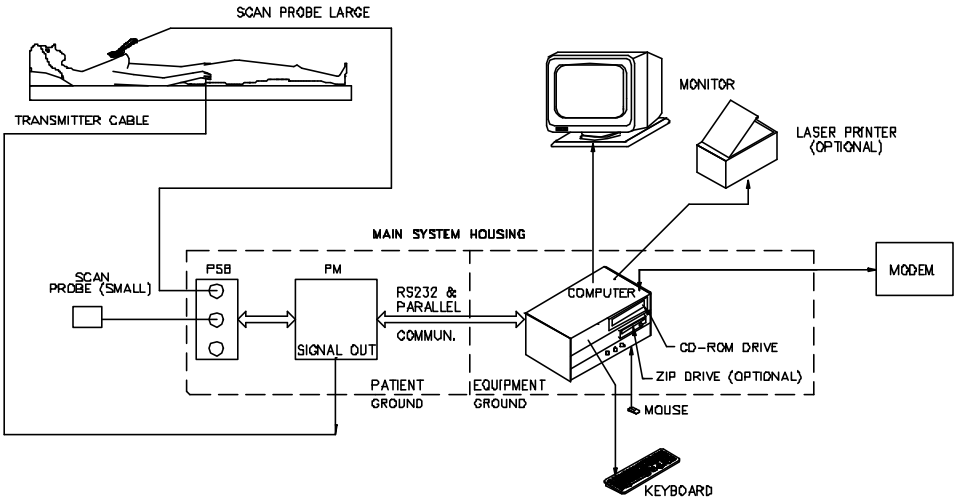

Figure 2-2: TS2000 System Block Diagram

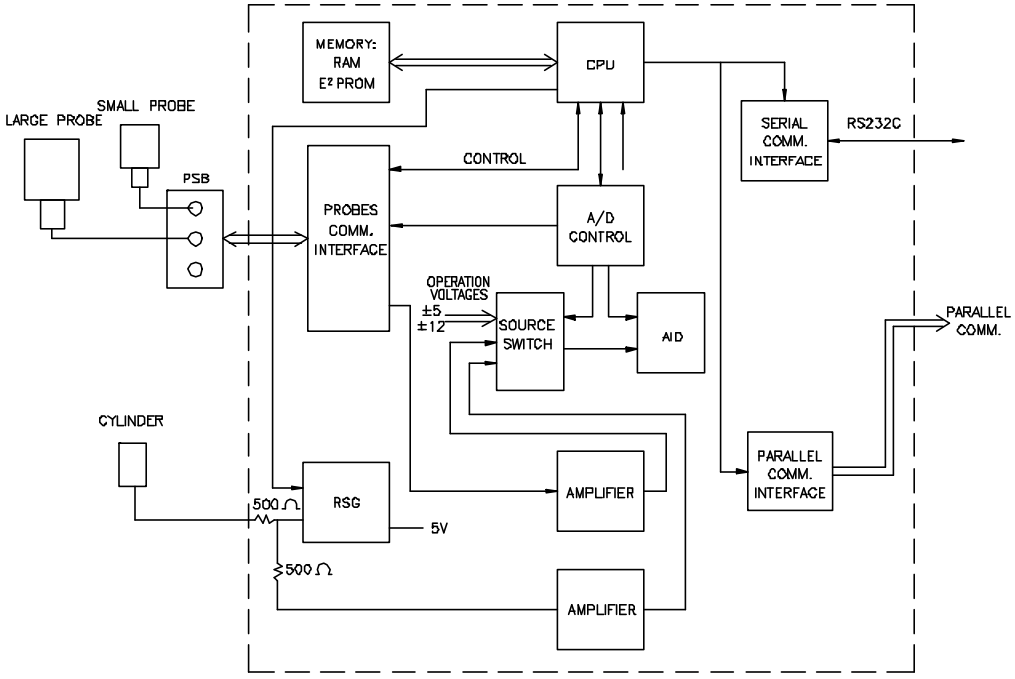

Figure 2-3: System Block Diagram

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2.4 General System Work Flow

When a scan is performed, the system sends an electrical current through the transmitter cable into the hand-held cylinder. The current then flows through the patient's body and is detected by the scan probe. The current is then picked up by the scan probe. The current picked up by the scan probe is sent to the TransScan system that determines the changes in the electrical impedance. The output is then displayed on system monitor.

2.5 Monitor

The monitor specifications are as follows: 17 inch super VGA, 640 × 480. The monitor provides the display of the user interface, including all patient data entries and their resulting T-Scan images.

2.6 Keyboard and Mouse

The keyboard and mouse are standard PC compatible devices that are used by the TS2000 for system operation and data entry.

2.7 Main System Console

The Main System Console is comprised of the Computer Base (PC), the Processing Module (PM) and the Probe Selection Board (P.S.B.).

2.8 Computer Base (PC)

The Computer base is a PC with the following configuration:

- Intel Celleron A300 MHz (or better) with 256 kb EXT. cache, or equivalent CPU
- 32 MB RAM
- 6.4 GB hard disk, or larger
- AGP VGA adapter
- 1.44 MB floppy disk (optional)
- CD-ROM drive
- ZIP Drive

The PC platform has a medical grade requirement, which refers to the ability of the PC power supply to meet the AC mains leakage current requirements.

The Computer Base is the master controller of the system. It is responsible for the user interface, real-time acquisition, processing and display of the sensor data sampled by the Processing Module, as well as database archiving and replay, hard copy, and communications.

2.9 CD-ROM Drive

The CD-ROM is used to load software to the system.

2.10 Modem (TeleService Package—Up to Serial # 2087)

A modem is included in all units up to serial number 2087.

Use the modem for "Remote-Diagnostic" of the system, through a standard telephone line. The Modem can be an ANALOG or ISDN type.

The remote diagnostic option can be used for data transfer, operational problem-solving and remote consultation.

2.11 Zip Drive

The internal zip drive is used to archive data from the system. Each zip diskette can store more than 100 patients.

2.12 Printer (Optional)

The printer specifications are as follows: IBM LEXMARK model OPTRA K 1220 (1200dpi), or equivalent. The printer allows for immediate hard copy viewing of the T-Scan image for the purpose of diagnosis and/or referral.

2.13 Processing Module (PM)

The Processing Module (PM) consists of a card housed in a case above the computer. Located in the back of the PM is the connection panel, which links the PM to the Transmitter cylinder and the PSB.

This unit contains the analog processing electronics, and the reference signal generator. This unit also includes a suitable power supply for operation of the PM. This unit includes interfaces and connectors to standard PC compatible serial ports, and a special parallel interface board.

The Computer Base controls the PM. It generates reference signal waveforms for transmission through the body, acquires and pre-processes the sampled signals from the probe sensor arrays and then transmits them to the computer via a parallel communication interface port and through high-speed (115.2 Baud) RS232 link. The PM also limits the current of the applied signals for safety of the patient, and medically isolates the patient from ground.

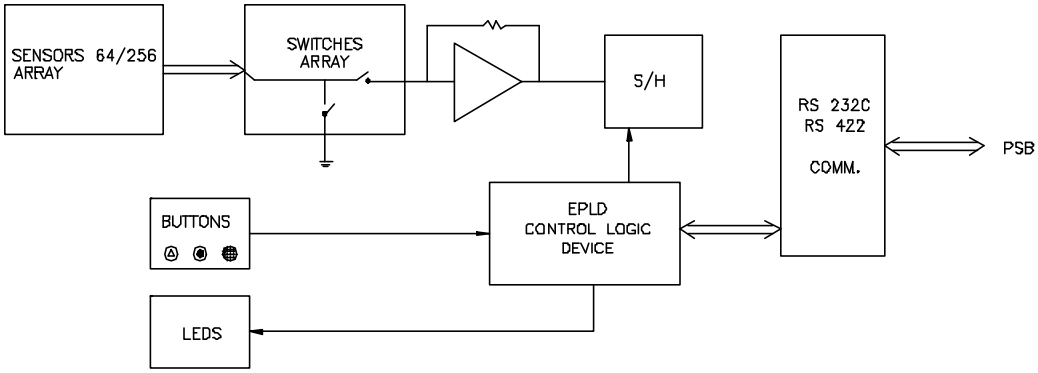

Figure 2-4 Processing Module -Block Diagram

2.14 Probe Control Unit

The Probe Control Unit consists of:

- CPU
- RAM configurable as 32 KB × 16 or 128 KB × 16
- Flash ROM of 128 KB × 8
- Reset Circuit
- 14.7 MHz Crystal Oscillator
- PC Serial Interface
- Local I/O Interface
- PC Parallel interface

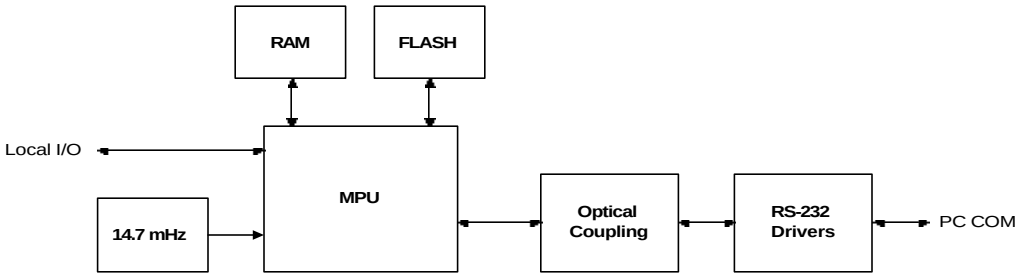

Figure 2-5 Probe Control Unit Block Diagram

The CPU boots after reset from the flash memory and continues by running some POST (Power On Self-Test) diagnostics. In addition to the POST software, the flash ROM also contains communication and flash programming software, as well as probe specific parameters.

Acquisition and interrupt handling software is loaded to the RAM before execution, in order to attain maximum performance.

2.15 Reference Signal Generator

The Reference Signal Generator (RSG) consists of the following blocks:

- A Programmable Sine Wave Generator
- A Programmable Gain Amplifier

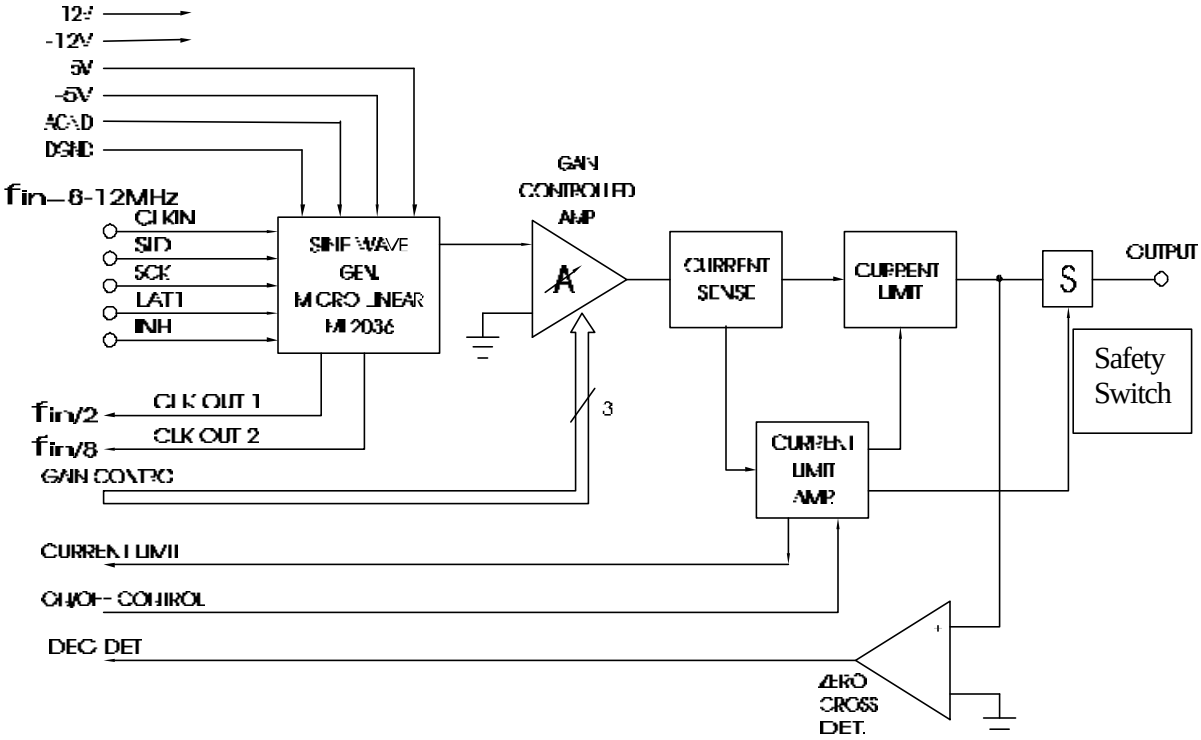

Figure 2-6: Reference Signal Generator Block Diagram

The CPU controls the RSG in order to produce the required frequency and amplitude during an acquisition cycle.

2.16 Probe Selection Board (PSB) Overview

The purpose of the PSB is to enable the operator to work simultaneously with up to three probes. Currently the system is supplied with two probes, large and small. The probes are connected all the time, and by pressing the “GO” button on one of them the system selects the probe, and connects its data lines to the PM board.

2.17 Scan Probes (Small Probe, Large Probe)

The Scan Probes are housed in a hand-held casing. The probes are connected by a flexible multi-cable to the connection panel on the PSB (Probe Selection Board) located at the back of the system. The mouse on the cart enables the operator to use the mouse cursor, in order to indicate the probe position and to control all aspects of the system, via the standard Windows interface. The probe has a control panel that enables the operator to select from among the following functions:

Function	Activity
START/STOP	Starts or stops the acquisition cycle without recording the image.
REC	Records the current sector image, using the pre-selected frequencies.
RES	This is a toggle function that lets you choose between high resolution (16×16) or low resolution (8×8) image acquisition settings (operational on 256 probe only).

2.18 Probe Scan Arrays of

The Scan array is located on the opposite side of the hand-held unit from the control panel. The probe consists either of 256 (16×16), or 64 (8×8) sensing pads (elements). The 256 Scan Probe array measures 8×8 cm in size, the 64 Scan array Probe measures 4.5cm $\times$ 4.5cm. The examiner will select the best-suited probe for covering the breast under examination. Each sensing pad is a 3×3 mm square electrode print which enables rapid manual scanning of the breast. Each pad can be individually grounded (via a low resistance switch), or connected to the amplifier. In order to view an entire breast (of typical size) it requires the scanning of a matrix of nine sectors.

2.19 Transmitter (Reference) Cylinder

The Transmitter Probe consists of a coaxial cable that attaches to the Reference Source connector on the connection panel (located on the back of the PM) on one end, and to the hand of the patient (using standard ECG clip) via a transmitter cylinder on the other end. The Transmitter cylinder applies a sinusoidal signal of amplitude up to 2.5 volts, at a frequency selected by the Exam Protocol via the computer, driven by isolated signal generation electronics on the PM.

The transmitter cylinder is made of stainless steel.

2.20 Software Overview

The TS2000 software consists of three major modules. These modules are the main application, the PM software, and the FoxPro database management software.

The main application runs on the Computer under MS-Windows NT and controls the entire system. It runs the graphic user interface, the system self-test, sends instructions to the PM and receives data from the PM (via RS232 link and parallel I/O card) in order to gather the raw data. It sends the processed data to be stored in the database (via software DDE Channel). In addition, the main application takes the processed data and interprets it into visual images (via display procedures). The main application can also draw the data graphically and provide several processing functions.

The PM software runs on its own microprocessor on the Processing Module board. It interprets the instructions sent by the main application, gathers the raw data, and sends it back to the main application (via RS232 link and parallel I/O card).

The FoxPro database management software runs on the PC under MS Windows NT. It communicates with the main application via a DDE channel. The processed data is sent by the main application to be stored in the database. The software can also recall the stored data and send it back to the main application for replay, upon request. The database stores information about the patient (such as demographic data, clinical data, history etc.) for later use. The database can also be used to graphically depict the location of the finding on top of a torso image. The database is also responsible for printing reports upon request. *See* Figure 2-7: TS2000 Software Block Diagram.

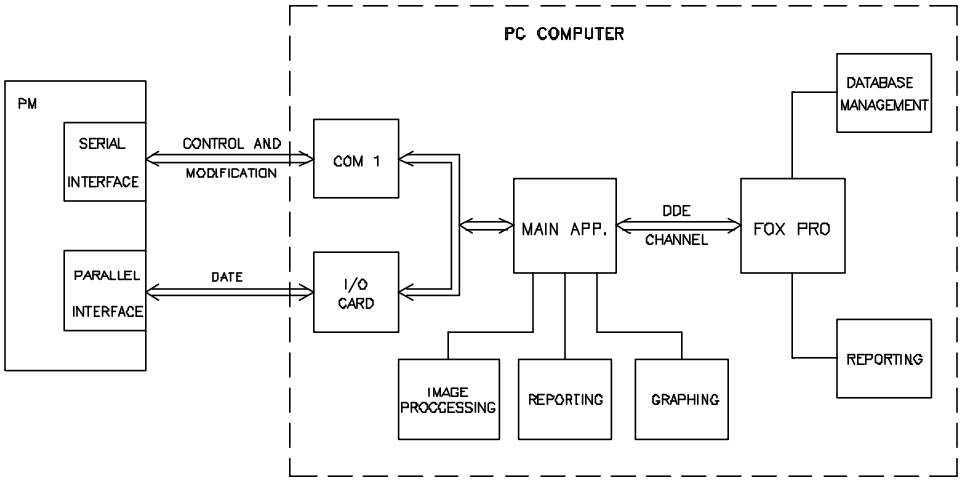

Figure 2-7: TS2000 Software Block Diagram

3. INSTALLATION OF OPTIONS

3.1 System Setup

To set up the system, follow the instructions in the System Manual, in the section: “Installation and Start Up.”

NOTE:

If the AutoRun feature fails to start upon installation of an auxiliary software program, proceed as follows:

1. Click **Start**|**Run**.
2. Click **Browse**, and select the CD-ROM drive.
3. Double-click the program's setup file.

NOTE:

System operating voltage changes must be factory set—not in the field.

3.2 Laser Printer (Optional)

3.2.1 Set up the Laser printer:

1. Set up the system following the directions listed above in "System Setup.” The system power should be turned off before continuing with the printer setup procedure.
2. Open the Laser printer box, take the printer out and place it on the floor in front of the bottom shelf (third shelf) of the cart.

CAUTION:

Check that the correct voltage for your country is displayed on the back panel of the printer (for U.S. 115VAC; for Europe 230VAC).

3. Connect the printer data cable to the printer.
4. Connect the power cable from the Isolation Transformer to the printer.

5. Slide the printer back into the shelf until it is secured.
6. Slide the paper tray out and fill it with “A4” paper. Return the tray to its place.
7. Turn on the system. Turn on the printer.

NOTE:

The system has been set up to use “A4” paper. If there is a need for any other paper size, the printer and the system must first be set up.

3.2.2 Print Resolution Adjustment

1. Exit to Windows.
2. Select Start/Setting/Printers.
3. Right click on the Printers Icon (OPTRA K1220 PS2).
4. Select Document Defaults/Advance/Graphics.
5. Select Print Resolution=1200 Quality/ and click on O.K.

3.3 Modem (Until Serial # 2086)

3.3.1 General

The modem is part of the Teleservice package and is factory installed.

For Com Port 2 setup, see section 6-3.

1. Connect the telephone cable to the wall socket of a direct telephone line (if necessary replace the cable/plug to fit your telephone system).
2. Verify that the Modem turns on together with the system.
3. Verify that the Modem is initialized during the Windows startup session (make sure that the lamp marked TR [for analog type modem] is on and appears on the window screen, next to the start button where a message will appear: “PC Anywhere Waiting”).

3.3.2 Change from ANALOG to ISDN

1. Start the system/ select Exit and “Exit to Windows”.
2. From Start menu, select Settings/ Control panel; double-click on “Modems."
3. Select the “Standard Modem…” and click Remove/Yes/Close.

4. Close Control Panel and turn system off.
5. Install the ISDN modem and connect it to the power supply and the system.

NOTE:

Insure that the ISDN modem supply voltage is compatible to the previously installed modem.

Repeat steps 1 and 2.

6. Select the button “Don’t Detect….” / Next.
7. Select the “Have Disk” and insert the Diskette (or CD-ROM) that was supplied with the modem; click OK.
8. From the list, select ISDN TA (Internet MLPPP, 128K) modem; click next.
9. Select “COM 2” from the list, click Next/ finish/ close.
10. Close “Control Panel” and restart the system.

3.3.3 Change from ISDN to ANALOG

1. Start the system/ select “Exit” and “Exit to Windows”.
2. From Start menu, select Settings/ Control panel; double-click on “Modems”.
3. Select the “ISDN TA (Internet MLPPP, 128K)” modem; click Remove/Yes/Close.
4. Close Control Panel and turn system off.
5. Install the Analog modem and connect it to the power supply and the system.
6. Start the system/ select “Exit” and “Exit to Windows”.
7. From Start menu, select Settings/ Control panel; double-click on “Modems”.
8. Select the button “Don’t Detect….” / Next.
9. Select the “Have Disk” and insert the Diskette (or CD-ROM) that was supplied with the modem; click OK.
10. From the left list select Standard Modem Types and from the right list select “Standard 28800 bsp modem”; click Next
11. Select “COM 2” from the list, click Next/ finish/ close.

12. Close “Control Panel” and restart the system.

3.3.4 Verifying Operation

1. Call the telephone number that the Modem is connected to.
2. When the Modem responds, the customary Modem sound will be heard.

3.4 Internal Zip Drive (Atapi Model)

3.4.1 Hardware Installation

1. Perform steps 1-9 from the section “replacing the computer."
2. Install the Zip drive below the CD-ROM drive.
3. Set the CD-ROM to be the “Master Drive."
4. Set the Zip to be the “Slave Drive."
5. Connect the “double data cable” to the CD-ROM and Zip drives.
6. Connect the other side to the Mother Board.
7. Connect power to the Zip drive.
8. Close up the computer and turn the power on.

3.4.2 Installation of Zip Drive Software

NOTE:

Refer to Section 4.4.5 for the Zip Drive software installation procedure.

4. SOFTWARE INSTALLATION AND UPGRADE

NOTE:

System upgrades will be provided as kits with all the necessary material.
The System Software is installed at the factory.

The System will be supplied with the following CD's – Windows NT 4, WinNT Service Pack 4, Iomega Tools For ZIP drive, Lexmark software For Printer, ATI software for display adapter, Application & Service CD and one CD with all the necessary software required to operate the system (including TS2000 system software).

4.1 Verifying the Actual Software Version

From the Welcome Screen, start a new exam.

1. Click on "Maintenance"/ "Version"; the TransScan Windows Application Box appears.
2. Verify the following data:
   a. Version
   b. Database Version
   c. PM Version
3. After verification, click OK.

4.2 Full Software Installations

Complete installation of the software is carried out at the factory. If an unrecoverable problem occurs with the software, or if a hard disk needs to be replaced, a complete reinstallation of the software has to be performed.

4.2.3 Installation Procedure

NOTE:

If you cannot set the CD-ROM drive as the boot drive, use the Windows NT boot diskettes, that are part of the Windows NT package, to install Windows NT.
If you are missing boot diskette from the setof three diskettes, create a new set of diskettes when so queried during the Windows NT installation

The following procedure details the software installation order:

1. See Section 4.2.2 for instructions about formatting your hard drive.
2. Install Windows NT Workstation operating system 4.0. (See Section 4.4.1.)
3. Install WinNT Service Pack 4. (See Section 4.4.1.)
4. Install VGA driver. (See Section 4.4.2.)
5. Install printer driver (See Section 4.4.3.)
6. Install PcAnywhere software. (See Section 4.4.4.)
7. Install ZIP driver software. (IomegaWare) (See Section 4.4.5.)
8. Install additional software from the TransScan CD-ROM2. (See Sections 4.4.6 to 4.410.)
9. Set the keyboard language (See Section 4.4.11.)
10. Install TS 2000 software. (See Section 4.4.12.)

4.2.4 Formatting the Hard Drive

Formatting the hard drive is part of the WinNT installation. Format the hard drive as follows:

1. Follow steps 1 to 7 in Section 4.4.1.
2. Press "D" to delete the existing partition, then press "Enter," and then "L."
3. Press "C" to create a new partition. Use the same disk size and press "Enter."
4. Select (with the down arrow) NTFS File System. Press "Enter" to begin the hard drive format.
5. When format is complete, continue with step 8 in Section 4.4.1 from "press 'Enter' to install WINNT 4 to the directory..."

4.3 Upgrade of TS2000 Software

On a time-to-time basis, TransScan will supply a new version of software for the

TS2000 System. The upgrade will be supplied on a CD-ROM, and will be performed by the service engineer.

To perform the upgrade:

1. Install the CD with the new software version into the CD-ROM Drive (the CD has an auto-run program).
2. Wait for approximately 15 seconds after the program begins and click "Next."
3. After successfully loading the software, click on "Finish".

If AutoRun does not start, proceed as follows:

1. From the "START" Menu select "RUN", then "BROWSE".
2. From the CD Menu select "SETUP"/ "OPEN".
3. Click "OK"; the program will then install the new version on your system.
4. Click "FINISH", remove the CD and restart the system.

4.4 Additional Software Installation

To install the software used in this system (which should be in the "windows" screen), follow the instructions below:

4.4.1 WIN NT4 Installation (Including Service Pack 4)

1. Access the computer's BIOS setup. (Press "Del" when the computer boots-up.)
2. From "Boot Order," select CD-ROM as the first boot drive.
3. Insert the WIN NT4 CD into the CD-ROM drive.
4. Re-boot the system. The WIN NT4 installation begins automatically.
5. Select "Setup Windows NT Now," and press "Enter" twice.
6. Press "Page Down" and then press F8.

7. To install a fresh copy of Windows NT, press "N," then press "Enter."
8. Leave the disk size as is; press "Enter" to install the software into the directory "\WinNT," then press "Enter" twice.
9. Follow the onscreen instructions.
10. When the system re-boots, enter the BIOS setup and change the boot drive back to the hard drive.
11. Continue to follow the onscreen instructions, press "Next" twice.
12. Type in the name and organization information.
13. Type in the CD code and press "Next." Enter the password 123456. Confirm the password and press "Next."
14. Select "No, do not...." and press "Next" three times.
15. Select the "Do not connect" radio button and press "Next," then "Finish."
16. Select your time zone, and set the date and time parameters, then press "Close." When you reach this stage in the WinNT installation, you need to install the WinNT Service Pack 4.
17. Insert the WinNT Service Pack 4 into the CD-ROM drive and select "Install Service Pack 4. Follow the onscreen instructions.

4.4.1.1 Change the Start Up Time

1. Select Start|Settings|Control Panel|System.
2. Select the Startup/Shutdown tab.
3. Type in or scroll to the setting "5" in the "Show list for.xx seconds."
4. Click **OK** and close the Control Panel.

4.4.2 Installation of VGA Driver

NOTE:

ATI often changes the wording in their installation procedures. Therefore, there may be slight differences between the text in the following procedure and the actual wording on screen.

1. Insert ATI CD into CD drive and let auto run program to start. (CD type is according to the adapter installed in your system).
2. Select “Exit Install” from “Welcome” screen.
3. On the open screen of the system right click the mouse.
4. Select “Properties” from the menu.
5. From the menu select: Setting, Display, Type, and Change.
6. Select “Have disk” “Browse” The CD drive (normally on “F”), click “WinNT”, and click ATI DRIVE.
7. Select “Open” then “OK."
8. From the list select: “3D rage pro turbo (English) then OK.
9. Press “Yes”, Software will load to disk.
10. Press “OK”, “Close, “test”, “OK”, ”Yes”,”Close”, and “Yes” to restart the system.
11. Select “OK."
12. 13. Make sure Color Palette is 256 Colors and desktop area is 640X480 pixels.
13. Select OK and remove CD.

4.4.3 Installation of Printer Driver

1. Insert printer software driver CD into the CD drive ,and wait for the “Auto run program to start.
2. Select “Install software”
3. Select “Printer software”
4. Click on CD picture.
5. Select “Agree”.
6. Select “Custom install” radio button and click “Next”.
7. Select “Local Computer”, and click “next”
8. Select “Printer drivers” and click “Next”.

9. Select model “Lexmark Optra K 1220 (or another model according to the printer that you have in your system.)from the list ,click “Add” then click “Next”
10. On drivers screen for Lexmark Optra k 1220 PS2 set the following:
11. Select “Port LPT1”, in “Change setting” screen select “LPT2” from the list and click on “default Printer” radio box.
12. On “Lexmark Optra K1220” change port as in step 10.
13. Select “Finish” installation: software is loaded. When loading is completed click OK and Exit.
14. Remove CD
15. Remove the paper drawer and make sure that the slider on the side of the drawer is set to paper size A4 (Or to a different size according to paper used)
16. To set up the computer:
17. Exit to Windows.
18. Click Start, Setting, Printers.
19. Right click on the printer icon marked: Lexmark… PS2.
20. From the menu select:”Document Default”.
21. Set the paper size to A4 210x297 mm.
22. Set the graphics to 1200 Quality.
23. Click “OK” and then close the printer windows.

4.4.4 PcAnywhere Installation

1. Repeat steps 1-5 from 4.4.6.
2. Select the PcAnywhere program from the CD.
3. Run “Setup” from disk #1.
    1. Click “next” for the 2 following dialogs.
    2. Click “Yes” for the 1 following dialog.
    3. Click “next” for the 2 following dialogs.
    4. Program will load itself.
    5. Click “next” for the 3 following dialogs.
    6. Click “Skip” for the 1 following dialog.
    7. Click “No” for the 1 following dialog.
4. Remove the CD/ Click “Finish” (to restart the system now).

5. After the system restarts, click “Exit” and “Exit to Windows."
    1. From the “Start” menu, select “Programs”.
    2. From the PcAnywhere 32 menu, select the PcAnywhere program.
    3. From the program screen, select “Be a Host PC”.
    4. From the File menu, select “Application options”.
    5. In the “Host operation” dialog box, select “Ring number = 4 and click on “OK”.
    6. Right click on the Modem Icon.
    7. From the menu, click on Properties.
    8. Click on the “Settings” tab and then click on the “Start with Windows” box.
    9. Click “OK” and then click “Exit the Program”.

4.4.5 Zip Drive Software installation

1. From the “Welcome” screen, click on “Exit"/ “Exit to Windows."
2. Insert the “IOMEGA” software CD into the CD drive
3. Let the “AutoRun” program to start.
4. Select “English”
5. Click “Next” “Yes” “Next”
6. Software will load itself to the disk.
7. Click “OK” (If needed follow the instruction in the information screen)
8. (If the Windows NT Setup box appears with the message: “The Drivers…are already on the system”, click “New”; the Window NT Setup box appears.)
9. Remove CD and Click on “OK” to restart the computer.

4.4.6 Installation of ODBC Software

1. Insert the CD with the new software version into the CD-ROM Drive
2. Wait 15 seconds; the TS2000 installation program will start.
3. In the welcome dialog box, click “Cancel."
4. In the Exit Setup dialog box, click “Exit Setup."
5. With the NT explorer, browse the CD (should be drive F).

1. Run the PreSetup program from the CD.
2. Select “Install ODBC”, and then “Continue”.
3. From the Menu, select “Microsoft Fox Pro Driver” and click “OK”.
4. When finished, click “Close”/ “OK”/ and then close “ODBC” window.

4.4.7 Installation of I/O Card Software

1. Follow steps 1-6, from 4.4.6.
2. Select “Install Computer Boards Driver”, then click “NEXT” three times.
3. Select “NO” on Readme note, and click “NO” to restart.
4. From the “Computer Board” Menu, double click on “INSTACAL”, click “OK” and then close the windows.
5. If you are not installing other SW programs, restart the computer.

4.4.8 Installation of Port ID Driver Software

1. Repeat steps 1-6 from 4.4.6.
2. Select “Install DIPort IO Driver”, and then click “YES”, “NEXT”, “YES” and “NEXT” five times.
3. Click “FINISH” to restart (if you are not installing other SW programs), and close window.

4.4.9 Installation of Autolog Driver Software

1. Repeat steps 1-6 from 4.4.6.
2. Select “Disable” Windows NT.
3. Enter the password you used before, and then click “OK” twice.
4. Click “OK," and then restart the computer.

4.4.10 Software Installation

The software of the P.M. board will be occasionally upgraded and will be supplied on the same CD-ROM as the system software.

1. From the “Maintenance” menu in the exam screen, select “PM”.
2. Select “Download Software to PM.”
3. Select the line “Ver: pm” and click OK; the system will download the software and will reset the P.M.
4. Click “OK”.

4.4.11 Changing Keyboard Language

1. In the “Start” menu, select “Setting” and “Control Panel."
2. Double click on “Keyboard “ icon.
3. In the ”Keyboard Properties” dialog :If the required language is in the “Input Locals” list skip to step 5.
4. Click “Add”
5. In the “Add Input Local” select the required language from the “Input Locals” drop down box and click OK.
6. In the “Keyboard Properties” box, select “Input Locals” select the defined language from the “Input Locals” list, click on “Set As Default”, and click “OK”.
7. If the language was added the system will ask you for Windows NT Workstation CD-ROM. Place the CD-ROM in the drive, wait for a while. Close the WinNT setup dialog. Click OK to add the necessary files.
8. ***Warning: Do not start WinNT setup***
9. ***Close the setup dialog when it pops up***
10. Verify keyboard working according to the selected language.

4.4.12 System Software Installation

1. Insert the TransScan CD-ROM 3 Ver. 2.xx into the CD-ROM drive. Autorun begins the installation.
2. Select "Next." The software installs automatically.

5. PARTS REPLACEMENT

NOTE:

The replacement of the parts described in this section must be followed by a functional test. See section 7.4.
Each intervention (replacement or repair) must be recorded in the “records of service visits” in the manual.

5.1 Replacing the Computer

1. Turn the system power off. Disconnect any cables that have access to the electrical outlet.
2. Disconnect the main power connection, the power to the modem, the power cables from the monitor, the cables from the PM board, and the probe cables from the PSB.
3. Open the back of the case and remove the monitor, mouse, keyboard, printer and modem cables from the computer and move the case from the cart to a table.
4. Open the upper cover of the main system enclosure (Main Console) by unscrewing the four screws (two on each side).
5. Remove the bottom of the main system enclosure by unscrewing the four screws (two on each side) that secure it in place.
6. From inside the system, unscrew the three screws that are located on the upper front panel.
7. Turn the whole system over and unscrew the three screws that are located on the inside of the bottom front panel.
8. Turn the system right side up again. Disconnect the front panel switch (the connector that is on the right side of the T1 transformer). Even though the switch is disconnected, it should remain in the "OFF" position.
9. Remove the entire front panel. There are two edges on the sides of the front panel; unscrew the four screws that secure it (two on the bottom and two on the top). These screws can be accessed from the front of the main system enclosure.
10. Disconnect all the cables from the Computer connection panel (located in the back of the system). This includes computer power and communication cables.

11. Unscrew the eight screws that secure the computer to the bottom of the main frame.
12. Slide the computer out carefully and slide the new computer into place.
13. Replace and tighten the eight screws that secure the computer in place (at the bottom).
14. Replace and tighten the four screws on the side edges of the front panel (two on the bottom and two on the top) and reposition the front panel.
15. Connect the front panel switch (the connector that is on the right side of the T1 transformer).
16. Turn the whole system over. From the inside of the system, replace and tighten the three screws that are located on the inside of the bottom front panel.
17. Turn the system right side up again. From inside the system, replace and tighten the three screws that are located on the upper front panel.
18. Reposition the bottom of the main system enclosure by replacing and tightening the four screws (two on each side) that secure it in place.
19. Reposition the upper cover of the main system enclosure (Main Console) by replacing and tightening the four screws (two on each side).
20. Replace the main enclosure (Main Console) back on the second shelf of the cart.
21. Connect all the cables from the Computer connection panel.
22. Connect the main power connection, the power from the system to the monitor, the video monitor cable connection, the mouse and the keyboard connections.
23. Connect the probes back to the PSB board.
24. Connect all cables from the PM connection panel (located to the upper left side of the back of the main system).
25. Connect the system to the electrical outlet and turn the system on; the system is ready for use.

5.2 Replacing the PM Board

1. Turn off the power system.
2. Disconnect all cables from the main console and remove it from the shelf.
3. Open the upper cover of the main system enclosure (Main Console) by unscrewing the four screws (two on each side). Remove the ground cable. The PM board is located on the back right side when viewing the system from overhead.
4. Disconnect the J1 connector, the J2 connector, and the J3 connector from the PM board.
5. Disconnect the parallel cable from J3 on the PM adapter board.
6. Disconnect the data cable (PM to PSB) from the back of the PM board.
7. Disconnect the transmitter cable from the back of the PM board.
8. Unscrew all the screws that secure the PM board in place.
9. Slide the PM board out carefully.
10. Slide the new PM board into place.
11. Screw the four screws in the PM connection panel; tighten the three screws that connect the board in its position.
12. Re-connect the cables from #4 -#7.
13. Replace the upper cover of the main system enclosure. Secure it in place by tightening the four screws.
14. Place the main enclosure (Main Console) back on the second shelf of the cart and reconnect the cables.
15. Turn on the system power. The system is ready for use.

NOTE:

If the message “Communication Error” appears on the screen, then the J3 connector is not connected properly. Open the upper covers of the main system enclosure and reconnect the J3 connector.

5.3 Replacing the PSB Board (Mounted)

1. Turn off the power system.
2. Disconnect the probes from the PSB.
3. Unscrew the four screws securing the PSB asembly to the TSP.
4. Disconnect the data cable from the PSB.
5. Remove the PSB assembly.
6. Reconnect the data cable to the PSD.
7. Place the new PSB assembly and secure it to the TSP with the four screws.

5.4 Replacing the Isolated I/O card

5.4.1 Replacing Card

1. Perform steps 1-9 from the section "Replacing the Computer". (See instructions above.)
2. Slide the computer out carefully.
3. Unscrew the I/O card (one screw) from the Computer connection panel. The I/O card is located in the third slot from the bottom. Remove the I/O card gently.
4. Check the setup of the I/O card It should be COM2 -IRQ3 and LPT2.
5. Push the new I/O card into place gently (the third slot from the bottom).
6. Attach the I/O card to the Computer connection panel by replacing and tightening the screw.
7. Slide the computer back into place.
8. Perform steps 11-20 from the section "Replacing the Computer" (see above instructions).
9. Connect the system to the electrical outlet and turn the system on; the system is ready for use.

5.4.2 Jumpers on the I/O Isolation Card

The jumpers are located on the card at the base addresses of the serial COM ports and the parallel LPT port. If the card is installed in a PC that already has two COM ports and one LPT port, the suggested settings are:

- Serial—Com 2 IRQ 3
- Parallel—LPT 2

5.5 Replacing the Parallel Communication Card

1. Repeat steps 1-9 from the section "Replacing the Computer". (See instructions above.)
2. Slide the computer out carefully.
3. Remove the parallel card from the Computer Connection panel. The parallel card is located in the PCI slot. Remove the parallel card gently.
4. Install the new parallel card.
5. Perform steps 11-20, from the section “Replacing the Computer”.

5.6 Replacing the Scan Probes

1. Shut down the system.
2. Open the wooden bracket that holds the scan probe cables.
3. Hold the scan probe plug and pull it towards you. The plug will then move out of its socket.
4. Insert the new probe plug into the socket and push it gently until it is firmly in its place.

5.7 Spare Parts List

NOTE:

The following list also appears on the TransScan Service Manual CD-ROM.

Description	Catalog No.	Siemens Catalog No.
Cart	AY74010357	47 78 945 RVB75
Transmitter Cable	WA7408733-0	47 78 960 RVB75
Fan for TSP	BL00009(7)	47 78 689 RVB75
Fuse (4A/230V)	FU00059	
Fuse (6A/115V)	FU00057	
Hand held cylinder	AY74010249	47 78 952 RVB75
Isolated I/O Card	AY7401186	47 78 671 RVB75
Isolation Transformer Assay 115v/115v	AY74010292	47 78 887 RVB75
Isolation Transformer Assay 230v/230v	AY74010738	47 78 879 RVB75
Keyboard USA	47 78 598 RVB75	47 78 598 RVB75
Keyboard FRA	47 78 606 RVB75	47 78 606 RVB75
Analog Modem	MD10077	47 78 895 RVB75
ISDN Modem	MD10114	47 78 903RVB75
Monitor	AY74010341	47 78 572 RVB75
Mouse	Purchase locally (PS 2 Type)	
Processing Module Assay.	AY740810397	4778697RVB75
Power Supply Assay	MD10062	47 78 853 RVB75
Laser Printer (230V)	MD10115	47 78 861 RVB75
Laser Printer (115V)	MD10119	
Programmed Computer	AY74010297	47 78 663 RVB75
Scan Probe 64	AY74410013	47 78 804 RVB75

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Scan Probe 256	AY74410016	47 78 812 RVB75
Probe Selection Board Mounted	AY74010412	70 41 093 RVB75
External Zip Drive	MD10078	47 78 846 RVB75
Internal Zip Drive	MD10089	47 78 838 RVB75
Modular case for TSP	HB01188	47 78 630 RVB75
Transformer for Modem 115v	TM74010881	47 78 929 RVB75
Transformer for Modem 230v	TM74010880	47 78 911 RVB75
Service Kit (Service Phantom, transmitter cables, fuses)	AY74010310	47 78 986 RVB75
Verification phantom	AY74510240	47 78 978 RVB75
P.M. Serial Communication Cable	WA74010298	47 78 770 RVB75
PM Parallel Communication Cable	WA74010247	47 78 788 RVB75
PM-PSB Cable	WA74410233	47 78 796 RVB75
Printer Isolation Transformer 230V/230V	AY74010738	47 78 879 RVB75
Printer Isolation Transformer 115V/115V	AY74010292	47 78 887 RVB75
Service Phantom	AY24510241	
TSP (Assy.)	AY74010351	11 56 517 RVB75
UPS for 230V	BT 74110030	11 56 525 RVB75
UPS for 115V	BT 74110808	11 56 533 RVB75

6. TROUBLESHOOTING

NOTE:

1) The effectiveness of any repair and part replacement must be verified by a functional test. Refer to Section 7.4.

2) Each intervention (replacement or repair) must be recorded in the "record of service visits" section of the manual.

3) Replace "blown" fuses ONLY with the same type and rating as marked on the safety label adjacent to the power inlet, housing the fuse.

Be sure to unplug the power supply cord from the wall socket BEFORE attempting to remove and/ or check the main power fuse.

Every sophisticated system has the potential for an occasional problem to occur. This section explains how to diagnose and correct these problems.

In the following table, "Reboot the system" means: use the exit button to shut down the system properly, turn the power off, wait 4-5 seconds and then turn the power on again.

6.1 Error Messages

6.1.1 Displayed Error Messages

Messages	Solution
Replay Parameters Not Found.	• Try replaying another patient file. If still unable to complete the command, reboot the system.
Probe Not Connected.	• Check the cable connection for probe(s). If the system still does not respond appropriately, then reboot the system. • Replace the probe.
Error 327: Has no...	• Check that the parallel card is properly installed.

Continued next page:

Messages	Solution
Parallel card has no number	• Make sure the program was activated.
Modem Error A message on system startup	• Check power to the modem • Check the connection between the modem and the computer. • Make sure the modem is set to start up with the system
Error Message: PM is not responding to message 6...	• Check the Serial Communication cable connection in the back of the system. • Check that the 3 LED's on the P.M. board are ON • Check the voltages on the J2 connector on the PM. The voltages should be 5 Volts, +12 and -12 Volts. • Check that the setup for Com1 is 115200. • Check parallel cable connected the PM adapter to the I/O card.
Amplitude Error / over current	• Check that there are no foreign metals on the probe. • Check the connection cable between the PM and the handheld cylinder. • Press the "GO" button on the probe again. If the system is still not responding appropriately, reboot the system.

6.1.2 TransScan TS 2000 Error Message

1. Enter "Database."
2. Select "Service"/ "Errors" and Click "Print Last 10 Logs."

6.1.3 Windows NT Error Messages

1. Exit to “Windows”.
2. Click on Start and Select “Programs”/ “Administrative Tools”/ “Event Viewer."
3. Double click on the event to find event details.

6.2 Input/Output Problems

Problem	Solution
The Computer is not functioning.	• Check the Power cable connections. • Check the fuse in the “AC IN” socket. • Check that the switch under the front panel is in the "ON" position. • If the Computer is still not responding, replace the Computer.
The Mouse is not responding.	• Check for correct connection of the Mouse cable to the computer. • Check the Mouse on another Computer. If the Mouse is still not functioning correctly, then replace the Mouse.
The Keyboard is not responding.	• Check for correct connection of the Keyboard cable to the Computer. • Check the Keyboard on another Computer. If the Keyboard is still not functioning correctly, then replace the Keyboard. • If the LED’s on the keyboard do not work - replace the keyboard.
The Computer screen is black.	• Check the power cable of the monitor for proper connection. • Check the Data cable for proper connection. • If the front LED does not change to green, replace the monitor.

Continued next page:

Problem	Solution
No image on screen during "Scan in Target" or "Screening" modes. The image on the monitor is too dark.	1. Check serial communication (see section: PM and PSB test). 2. Check PM output. • Try adjusting the window level of the monitor (brightness and contrast). • Make sure that the gray level bar on the right side of the screen is fully visible. • Check the connection of the Transmitter cable to the Computer. • Check the connection of the Transmitter cable to the electrode. • Check that the T-Sense interface is positioned correctly and good contact is being made.
The image appears with the same black/white spot, no matter which sector is being examined with the Scan probe.	• Check if there is good contact for the Scan Probe. Tighten the contact. • Use the phantom and see if the problem remains. If so – move the probe around and check that the spots are displayed in a fixed location otherwise they are air bubbles. • Check if there is good contact between the cylinder and the patient's hand. • Make sure there is enough gel on the patient's hand. • If the problem remains, it indicates a dead sensor on the Scan probe and the probe should be replaced. ***WARNING***: Never connect or disconnect probes when the system is powered as this could cause damage to the system. Be sure that all connections to the electrical outlet are disconnected before changing probes.

Continued next page:

Problem	Solution
The system is not printing clearly or is not printing at all.	• Check the Printer cable connections. • Check the software Printer Driver setup • Check for errors on the printer's front panel and act accordingly. • Replace toner – contact local distributor.
The Scan probe is not responding.	• Replace the Scan probe.

6.3 Port Setup

Communication between the PC and the PM is through port COM1. Communication with the modem is through port COM2.

Set up ports according to the following steps:

1. From the main "Welcome" screen, click **Exit** and click **Exit to Windows**.
2. Click on the **Start**.
3. Click **Settings|Control Panel**.
4. Double-click **Ports**.
5. In the Ports Dialog Box, select Com 1 and then click **Settings**.
6. Adjust the Baud Rate to 115200 and click **Advanced**
7. In Advanced Settings click **Base I/O** select 3F8 from the list.
8. Click **IRQ**. drop down box / Select 4 and then click **OK**.
9. In the Systems Settings Change Box, select "Don't Restart Now".
10. In the Settings for COM 1 Box click **Close**.
11. In the Ports Box, click **COM 2|Settings**.
12. In the COM 2 settings, click **Baud Rate** and select 57600 from the list.
13. Click **Advanced**; the Advanced Settings for COM 2 appear.
14. Click **Base I/O** and select 2F8 from the list.
15. Click **IRQ** and select 3.
16. Click **OK** and then click **Restart Now**.

6.4 PM and PSB TESTS

6.4.1 Preparation

1. Exit system to Windows.
2. Access the Windows NT Explorer.
3. Double-click **PM Test** in the TransScan directory.

6.4.2 Serial Communication Test

1. Perform Preparation 6.4.1.
2. Click **PC2PM** to check serial communication between PM and computer.
3. Click **HELLO** in the menu.
4. On the screen, two response messages will appear (in bold letters). If this does not occur, refer to "Communication Error" in section 6.1.
5. Select "View" and click **Clear**.
6. Select "Single" and click **Probe**.
7. Check that: **A** is selected in the "Interf" box/ small is selected in the "Probe" box.
8. Click **Read** to get the ID of the PSB.
9. PSB ID ='03' will appear in binary form '0011' in the lower Data box. (Two checks in the last digits)
10. Click **Cancel** and repeat Step 5.

6.4.3 Check for the P.S.B: Socket (Port I.D.)

1. Insert the address 001 in the b6-b4 box in the lower control section and connect a probe to socket J1 in the PSB.
2. Click on the "Read" button; the address 0001 appears in the data section (b7-b0).
3. Move the probe to socket J2 and click on the "Read" button; the address will be 0010.
4. Move the probe to socket J3 and click on the "Read" button; the address will be 0100.
5. Clear the b6-b4 box. Do not clear to read.

6.4.4 Probe I.D. Test

1. Connect the small probe to J1, and select **ENA** in the lower Control section.
2. Click **Read**; the address 1011 appears in the Data section (b7-b0).
3. Connect the large probe to J1, and select **ENA** in the control section.
4. Click on the "Read" Button; the address 1100 will appear in the Data section (b4-b0).
5. Clear the **ENA** check box.
6. Click **Cancel** and **Clear** from the View Menu.

6.4.5 ACQ Test (Parallel Communication Test)

1. Perform preparation 6.4.1 and select "Probe" for the "Single" manual.
2. Insert the following parameters: a) amp=1, b) gain=2, c) freq=200; click on the "Accept Parameters" button.
3. Select "Auto restart" and click **Acq**; a wavy line appears on the screen indicating proper communications.
4. Click **Stop**. Clear the **Autostart** check box.
5. Close the Probe screen.
6. Quit the PM Test
7. Quite the Windows NT Explorer

6.4.6 Picture Uniformity, Tested with the Help of the System Phantom

To perform a functional test with the help of the service phantom, follow the instructions in the System Manual, in the section "Accessory Guide."

6.4.7 Check PM Output

1. Connect a DVM between the cylinder and the ground of the PM Output.
2. Press the Start/ Stop button on the probe.
3. Measure 1.5 -+ 0.5 VAC.

6.4.8 Verify Parallel Communication

1. Start a "New Exam."
2. In the "Targeted Screen," click "Crtl+Alt+S".

3. In the “Menu Bar," the “Tests” menu will appear.
4. Click on the Stop/ Start button on the small probe/ large probe; at the bottom of the screen, the message “FPS=X.XX appears.

NOTE:

X.XX must be 8.00-+1.00 for the small probe.
Nominal value is 8.66

X.XX must be 2.00-+0.5 for the large probe.
Nominal value is 2.15

5. Click again on the Start/ Stop button.
6. In the “Tests” menu, click on “Back to User Menu”.

NOTE:

All other programs are for Research and Development purposes only.

6.4.9 PM Board

On the PM, there are three red LEDs indicating presence of voltage. In order to measure the voltages on the PM Board, measurements are carried out between the ground of the output BNC and the following points on the PM:

#	ID	LED	Value
1	L6	LED L1	+5V+/-5%
2	L4	LED L2	+12V+/-5%
3	L3	LED L3	-12V+/-5%
4	Zener Diode D9 (next to U98)		-5V+/-5%

Fuses on the PM board are:

ID	Function	Fuse Value
F1	For +5v	4A
F2	For –12V (and also –5V)	3/4A
F3	For +12V	2A

6.4.10 PSB Board

On the PSB, there are 10 red LEDs, indicating the following:

#	ID	Indication
1	D4	+5V
2	D6	-5V
3	D7	+5V Port 1
4	D8	-5V Port 1
5	D9	+5V Port 2
6	D10	-5V Port 2
7	D11	+5V Port 3
8	D12	-5V Port 3
9	D13	Altera Mode
10	D14	Altera Mode

The Fuses on the PCB board are:

ID	Function	Fuse Value
F1	+5V main fuse to the board	2A
F2	+5V to port 1	1A
F3	+5V to port 2	1A
F4	+5V to port 3	1A
F5	-5V to port 1	1A
F6	-5V to port 2	1A
F7	-5V to port 3	1A

7. MAINTENANCE

NOTE:

This section describes the maintenance procedures that the service technician may perform.

In general the system does not require any calibration.

7.1 Phantom Check

The service engineer should perform a routine check of the system every time he visits the site, and when installing a system. In his routine visit, the service engineer will check all the cables, connection and general outlook of the system. The routine check will be performed with the help of the service phantom.

(SEE "ACCESSORIES GUIDE" FOR INSTRUCTIONS ON THIS CHECK)

Print out the phantom test at the end of the session and file it under Register 7 of the system manual.

The phantom is supplied in a container filled with a solution. On the side of the container is a level mark, indicating how much solution must be in the container. If the solution does not reach the level mark, solution must be added.

If the solution has become unclear, it must be replaced.

(See "Accessories guide")

7.2 Monitor Check List

1. Click on the display icon from the control panel.
2. Select "SETTING" and click on "Test".
3. Click on OK; the Test screen appears.
4. Click "Yes"/ OK.
5. Click on "Close" on the Control Panel.

7.3 Printer "Self Test"

To perform the printer "self test", follow the instructions in the printer manual under section test Menu.

7.4 Functional Tests

Perform the Functional Tests as follows:

1. Perform an examination in Scan Mode with the large probe.
2. Perform an examination in Targeted Mode with the large probe.
3. Perform an examination in Scan Mode with the small probe.
4. Perform an examination in Targeted Mode with the small probe.

NOTE:

For more details about Functional Tests, refer to the User Manual. IF a service phantom is not available, scan your own arm.

(See instructions in the “TS 2000 Accessories Guide," located at the back of the user manual.

8. APPENDIX

8.1 Detailed Hardware Platform Specifications

Environmental	
Operating Temperature	15°C to 40°C
Storage Temperature	-20° C to 55°C
Humidity	40-60% Non-Condensing
Probe Shock and Vibration	Portable, rugged
System	
System Computer	Pentium II A300 MHz (or higher) based PC
Electrical	
Operating Voltage	115/230-+10% VAC 50/60 Hz-+2HZ
Operating Power	250W
Probe Dissipation	<5Watts
Fuses	2 X 6.3A/for 115V 2 X 4A for 230V
Mechanical	
Computer Size and Weight	PC Std.
Scan Probe Size (64 Pads)	6× 6 cm
Scan Probe Size (256 Pads)	8.5 × 8.5cm
Scan Probe Weight (64 Pads)	580 grams
Scan Probe Weight (256 Pads)	660 grams
Safety and Regulatory	
Patient Safety	UL544, IEC601-2
Patient Signal Current	<5 milliamperes rms.
Emitted and Conducted Radiation	FCC Part 15

Functional

Measurement Frequency Range	58Hz to 4 kHz
Database entries	Limited by hard disk space
Display Levels	240 gray level
Database Access Time	≤ 5 seconds

8.2 Figures

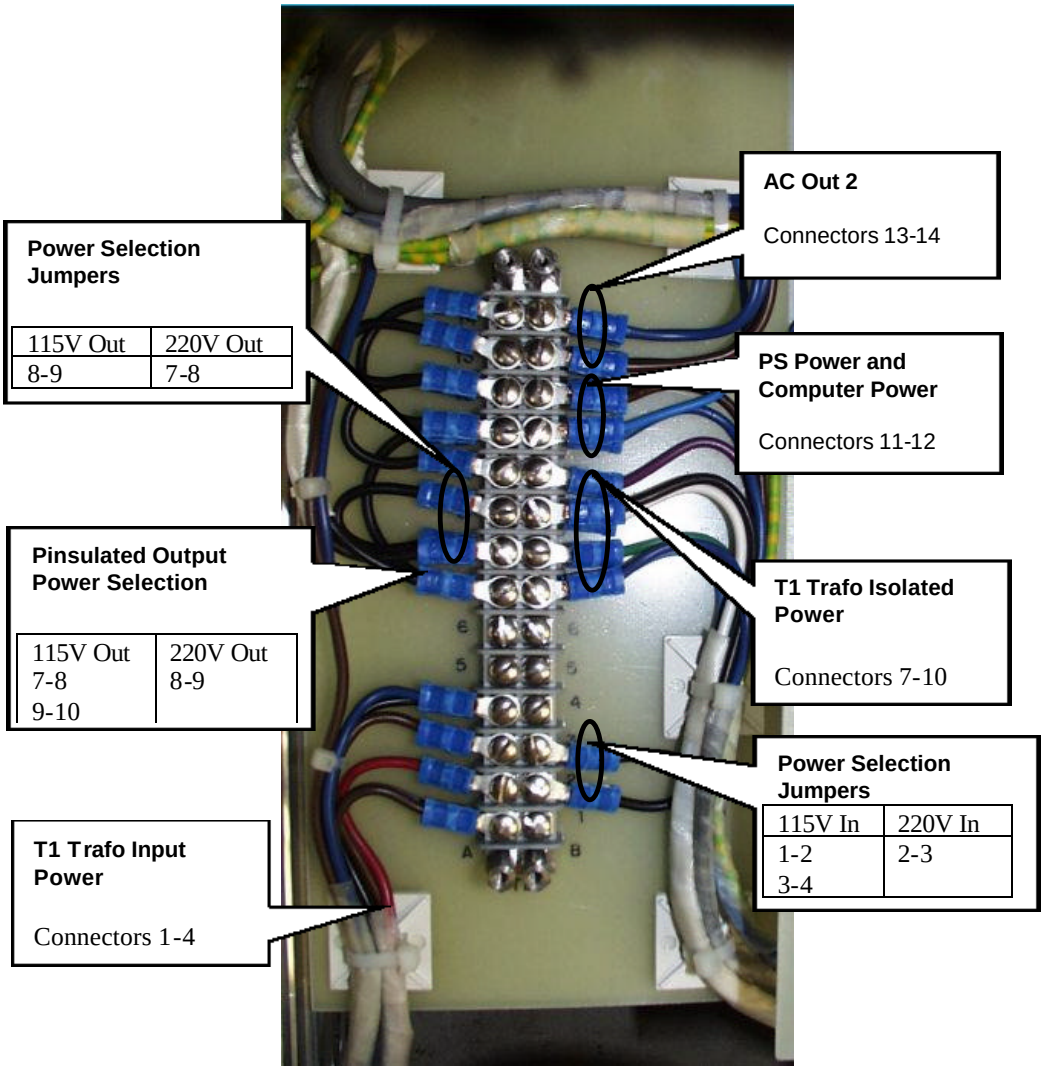

Figure 8.2.1: Electrical Wiring Connections

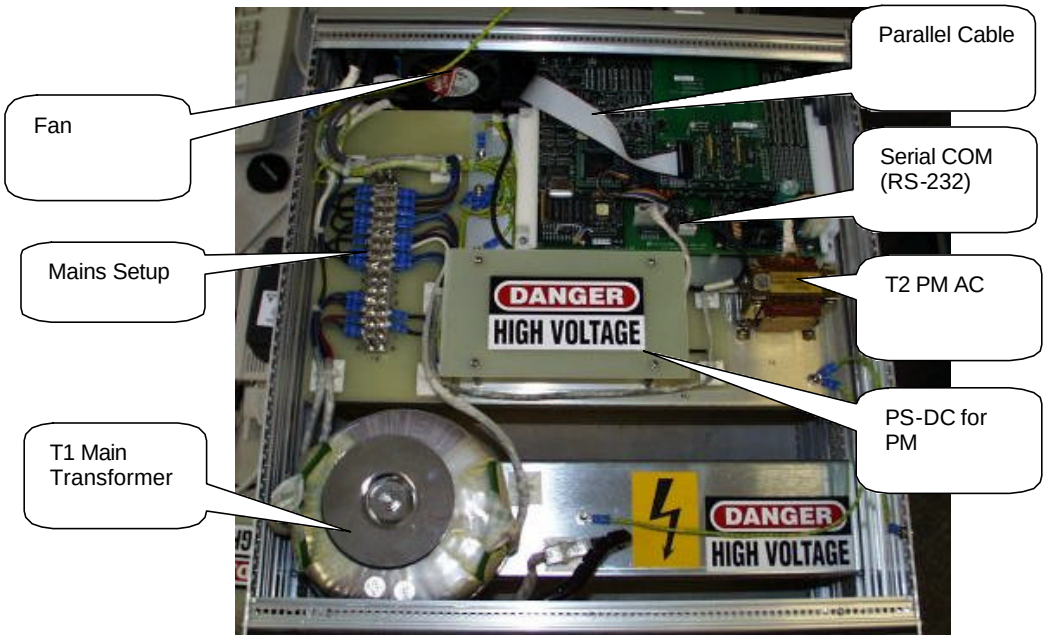

Figure 8.2.2: Overhead view

NOTE:

The change of operating voltage of the system must be carried out in the factory only and not in the field.

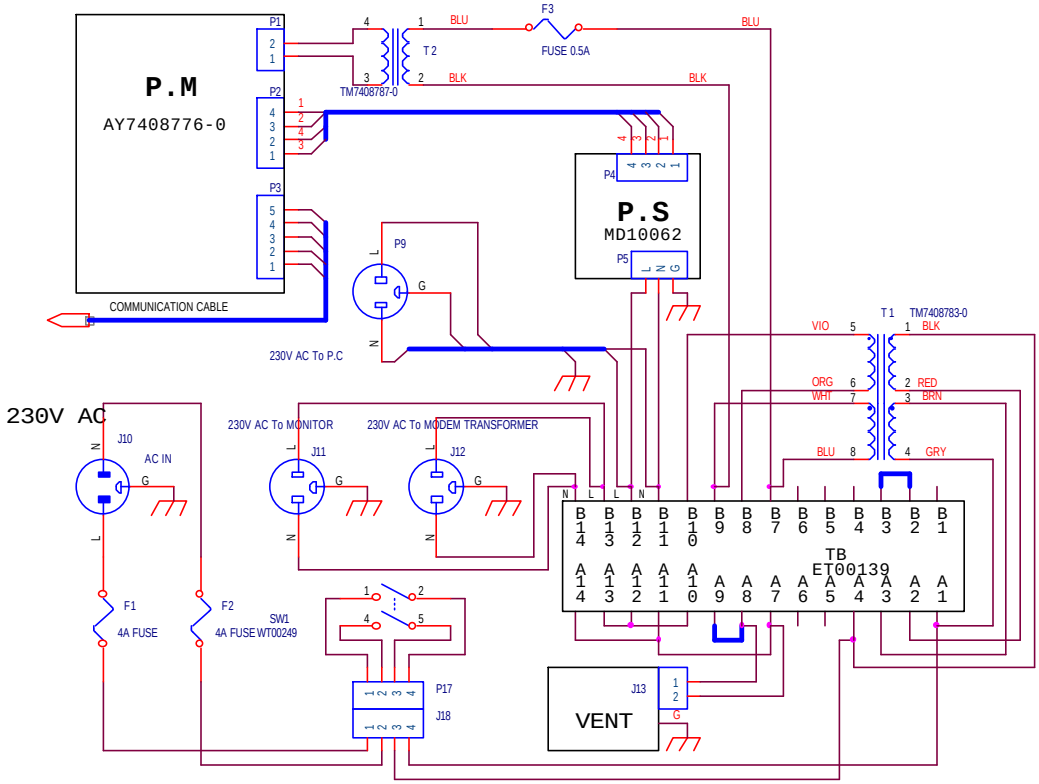

Figure 8.2.3: TSP Power Connection 230 VAC

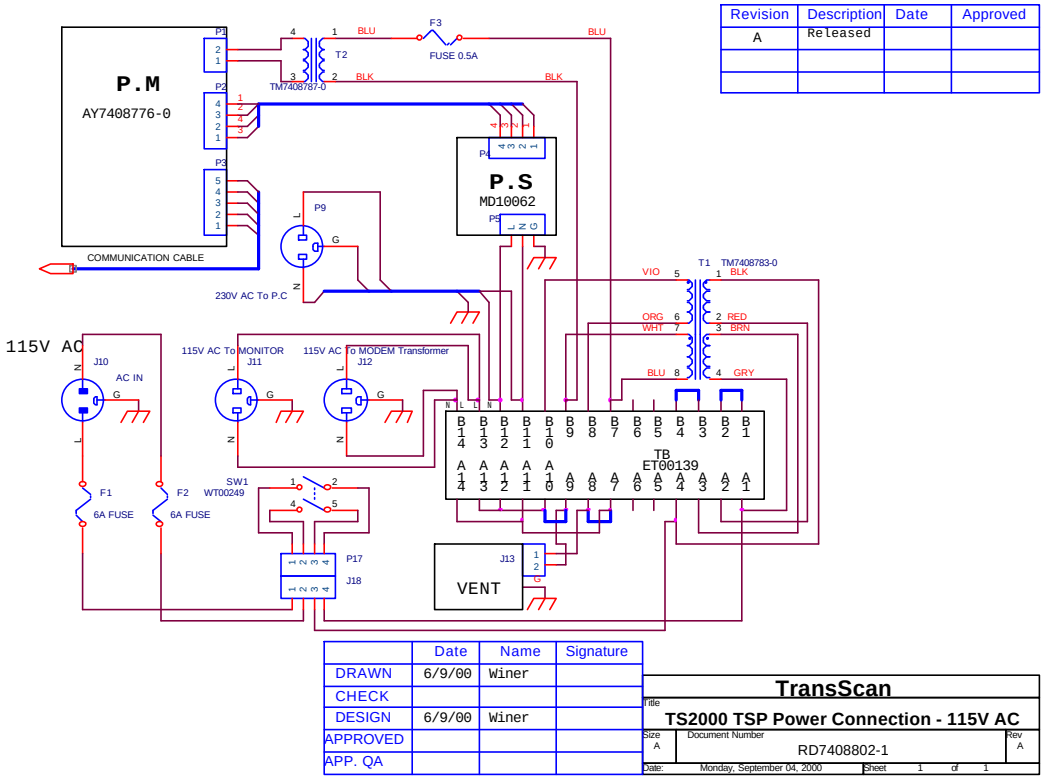

Figure 8.2.4: TSP Power Connection 115VAC

SPB7-520.840.01.01.02

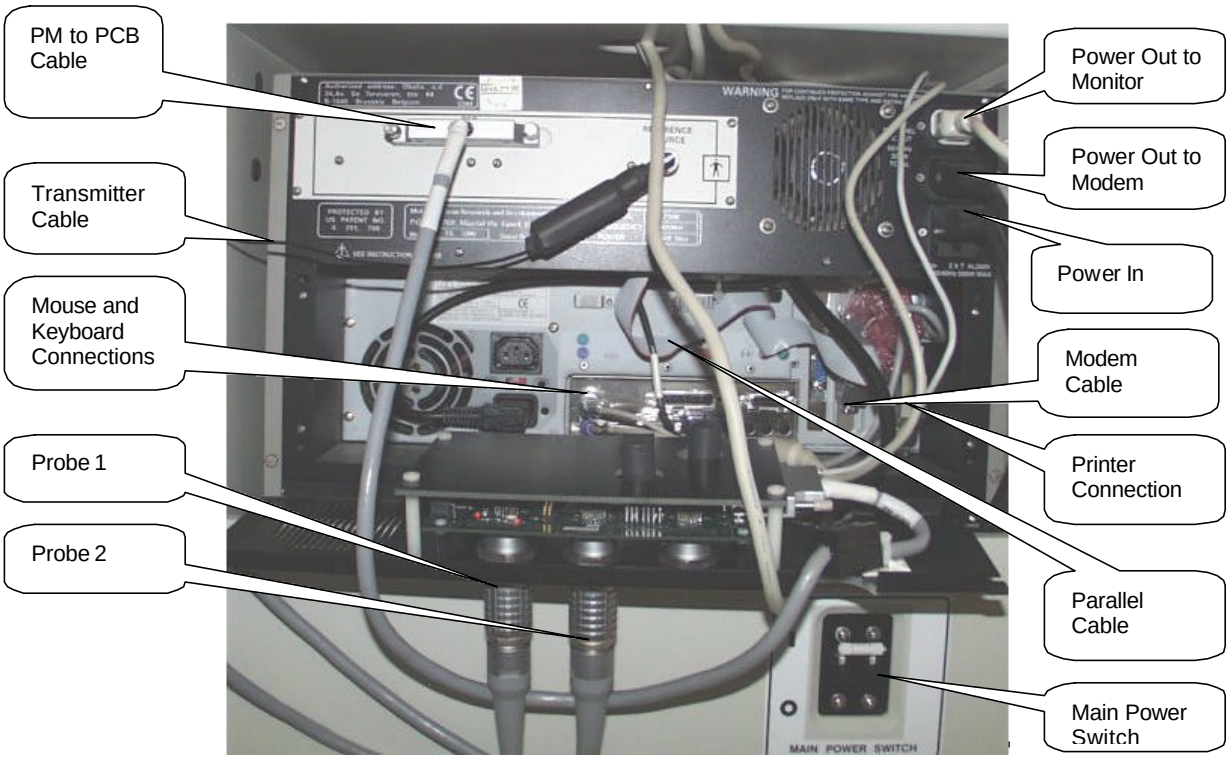

Figure 8.2.5: Cable Locations